

Psychological Resilience and Wellbeing in Adolescents Born Premature

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Except where due reference is made in the text, this thesis is my own original work. It has not been submitted for any other degree, or diploma at any university

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Abstract

Children born preterm often experience poorer psychological outcomes at each developmental life stage compared to full-term peers. However, this vulnerable population is often considered remarkable for their resilience in the face of adversity. To examine difficulties in psychological wellbeing and establish possible patterns of resilience with the preterm population, this study uses data from the prospective *Longitudinal Study of Australian Children (LSAC)* to assess the association between prematurity and the stability of internalising problems from 10-11 to 14-15 years. The study investigates the interacting effects of gestational period, gender and parental warmth on the stability of severity of internalising problems following the transition to adolescence. Data from 44 very preterm (VPT), 195 moderate preterm (MPT) and 2851 term born adolescent participants in the *LSAC* was used. Gestational period was found to be predictive of resilience, with durations less than 32 weeks associated with increased internalising difficulties during the transition to adolescence compared to non-preterm and moderate preterm. Gender moderated the association between gestational age and increased internalising problems with very preterm female adolescents encountering the highest internalising psychopathology and the greatest magnitude of change between middle childhood and adolescence. Parental warmth was not predictive of stability of psychological wellbeing in preterm respondents. These findings may help inform early intervention practices for preterm populations in boosting child coping capacities and peer and parent support prior to adolescence, and prompt further research into the mechanisms driving the distinct pattern of psychological resilience of females born very prematurely.

Keywords: Preterm, Internalising Problems, Adolescence, Resilience.

Psychological Resilience and Wellbeing in Adolescents Born Premature

Amongst populations considered particularly vulnerable to experiencing functional difficulties (including in their emotional and behavioural functioning) individuals born premature consistently show physical, cognitive, motor, social and psychological deficits to varying degrees (Burnett et al., 2011; Bhutta et al., 2002; Jaekal, Wolke & Chernova, 2012; Johnson, 2007; Sømhovd et al., 2012). Prematurity is categorised according to gestational period, with birth prior to 37 weeks deemed preterm (WHO, 1992). The incidence of prematurity continues to rise, with an average of 9-12% of infants born prior to 37 weeks gestation each year (Blencowe et al., 2012).

Thus far, clinical psychology research regarding preterm children has concentrated on deleterious medical, cognitive and socio-emotional outcomes. Aside from respiratory, cardiovascular, neurological and sensory deficits (Saigal & Doyle, 2008; Stoll et al., 2004), greater occurrence of internalising problems (i.e., depression, anxiety, withdrawal and loneliness; Aarnoudse-Moens, et al., 2009; Burnett et al., 2011; Westrupp et al., 2012), externalising problems (i.e., attentional deficit and conduct disorders; Johnson, 2007; Lindstrom, Lindblad & Hjerm, 2011; Schothorst, 2007), learning difficulties and cognitive delays (Bhutta et al., 2002) have been identified.

Resilience and Psychological Wellbeing

Primarily focusing on deficiencies misses a crucial part of the puzzle in achieving psychological wellbeing (Masten, 1999). Curiosity regarding the possible individual and system-oriented processes providing protection in the face of emotional and developmental challenges burgeoned in the 1950s, with research into 'resilience' accelerating with increased societal complexities (Rutter, 1987; Brooks & Goldstein, 2001).

Resilience refers to the process of positive adaptation following adversity, threat or trauma which has the potential to cause disrupted functioning or wellbeing (Masten, 2001). For the preterm population, threat initially presents via bio-neurological immaturities and early exposure to the extrauterine environment for which the infant is ill equipped (Kopp, 1990; Msall, 2004) and is further complicated by low birth weight, cognitive delays, socioeconomic stress and parental psychopathology (Bradley et al., 1994; Wolke, Jaekel, Hall & Baumann, 2013).

Within psychology, a reliance on negative symptoms exists in informing an individual's state of adaptation (Lorion, 2000). From this perspective, alleviating such symptoms confers positive long-term outcomes for the target individual. Resilient individuals may encounter transient instabilities in normal functioning however typically exhibit a stable trajectory of healthy psychological wellbeing across time (Bonanno, Papa, & O'Neill, 2001). Therefore, resilience reflects the capacity to preserve a "stable equilibrium" following the experience of threat (Bonanno, 2004, p. 20). Resilience is defined negatively in this paper, with lower levels of dysfunction at the critical and challenging adolescence period taken as indicative of greater psychological resilience. Smaller increments of change in psychopathology from childhood to adolescence signal an ability to maintain stable functioning, consistent with definitions of resilience as the preservation of equilibrium (Bonanno, 2004).

Resilience is an accumulation of interactions between genetic, personal and environmental factors (Werner, 1995). For the preterm population, several factors contribute to the maintenance of psychological equilibrium in the context of their unique biological and social adversities (Msall, 2004; Wolke et al., 2013). Neurological and physical impairments, intensity of medical intervention, socioeconomic status, perceived social connectedness, parenting quality and parental psychopathology are widely documented as mediating

socioemotional and academic dysfunction in adults born prematurely (Bradley et al., 1994; Jaffee, 2007; Mangelsdorf et al., 1996; Saigal & Doyle, 2008). Several time points across the lifespan require a resetting of psychological equilibrium following exposure to intra- and interpersonal adversities. The time between childhood and adulthood (adolescence) is particularly noteworthy given significant biological, cognitive and socioemotional development (Graber & Brooks-Gunn, 1996; Ernst, Pine & Hardin, 2006).

Adolescence: Transition of ‘storm and stress’

Adolescence is a time of transition, a ‘storm and stress’ period (Hall, 1904), requiring constant readjustment to novel neurobiological, psychophysiological and socioemotional changes (Cicchetti & Rogosch, 2002; Feldman & Elliott, 1990; Spear, 2000). Most youth navigate this transition effectively. Anxiety and mood related disorders, non-suicidal self-injury and substance abuse are, however commonly encountered (Paus, Keshavan, & Giedd, 2008; Rutter, 1992), with increased psychiatric difficulties coinciding with commencement of adolescence (Costello et al., 2003; Garber, Keiley & Martin, 2002; Ge, Conger & Elder, 2001; Merikangas et al., 2010). Anxious and depressive disorders increase parallel to with lifetime prevalence rising from 1% under 12 years of age to 17-25% by the completion of adolescence (Kessler, Avenevoli & Merikangas, 2001). The greatest increase in depression appears between 15-18 years and is commonly preceded by anxious symptoms with females demonstrating greater rates of symptomatology (Hankin et al., 1998; Beesdo et al., 2007).

There is considerable gender divergence in adolescent depression, with consistent findings of greater occurrence of depressive and anxious syndromes in females (Bennett et al., 2005; Ellis, 2004; Hankin et al., 1998; Silverstein, 1999). Males are reportedly more likely to encounter externalising difficulties (Bongers, Koot, Van Der Ende & Verhulst, 2004; Crick & Zahn-Waxler, 2003). Females commonly commence puberty earlier than

males and as earlier biological transformation is associated with higher rates of depression and anxiety (Caspi & Moffitt, 1991; Dick, Rose, Viken & Kaprio, 2000), pubertal maturation may partially account for the gender divergence. Importantly, women born prematurely often experience even earlier pubertal development (Persson et al., 1999; Hernandez & Mericq, 2008). Given timing of pubertal maturation is associated with early-life environmental factors (Ellis, 2004), early puberty may be an adaptation to life adversities, and thus associated with poorer socioemotional functioning (Del Giudice, 2009; Mensah et al., 2013).

As children navigate their way through developmental changes of adolescence, peer relationships have shown capacity to either ameliorate or agitate psychological dysfunction (Damon & Lerner, 2008; Hymel, Rubin, Rowden & LeMare, 1990). As adolescence progresses, behavioural norms and expectations become increasingly informed by peers rather than the familial unit (Arnett, 2014; Gifford-Smith, Dodge, Dishion & McCord, 2005; Greenberg, Siegel, & Leitch, 1983; Raja, McGee & Stanton, 1992). Peer support and inclusion are seen to promote resilience (Gazelle & Rudolph, 2004; Rubin et al. 2004; Richards, Crowe, Larson & Swarr, 1998) whilst peer problems including social rejection and withdrawal are commonly predictive of low self-esteem, anxiety and depressive symptoms (Boivin, Hymel & Bukowski, 1995; Parker & Asher, 1987).

Prematurity and adolescent psychological resilience and wellbeing

Given adolescence is a period of ‘storm and stress’ for all embarking upon the transition, additional adversity prior to this time (such as that associated with premature birth) may amplify risk of psychological distress and poorer psychological wellbeing (Deater-Deckard, Ivy & Smith, 2013). Whilst medical advancements have increased survival rates of preterm births from 40% in the 1960s to 90% in 2015 (Lemola, 2015), premature infants surviving beyond childhood remain highly susceptible to a multitude of cognitive,

psychological and behavioural challenges stretching into adulthood (Janssens et al., 2009; Lindström, Lindblad, & Hjern, 2009; Räikkönen et al., 2008; Schothorst, Swaab-Barneveld & van Engeland, 2007; Westrupp et al., 2012). Compared to term peers, premature individuals are at greater risk for depressive and anxious symptoms from preschool-age into adulthood (Aarnoudse-Moens, et al., 2009; Burnett et al., 2011; Johnson & Marlow, 2014). Sørhøvd and colleagues' (2012) meta-analysis indicated VPT adolescents were almost twice as likely to develop clinical anxiety (with a prevalence of 9.9% for VPT compared to 5.5% for term). This is accompanied by higher levels of neuroticism (Allin et al., 2006) and a tendency to be risk averse in adolescence (Schmidt, Miskovic, Boyle & Saigal, 2008). Pesonen and colleagues (2009) indicated young premature adults display tendencies for lower extraversion, openness to experience and higher conscientiousness, a pattern replicated by Pyhälä and colleagues' (2009) reporting lower assertiveness and sensation seeking.

Preterm children tend to experience poorer social competence than peer terms, encountering lower levels of positive peer play and greater difficulty maintaining positive peer relationships, persisting into adolescence (Jones, Champion & Woodward, 2013; Ritchie, Bora & Woodward, 2015). Such difficulties are particularly pronounced in VPT females (Spittle et al., 2009). As the relationship between peer problems and internalising difficulties is bidirectional (Damon & Lerner, 2008; Hymel et al., 1990), considering both outcomes as indicative of psychological functioning may permit a more comprehensive conceptualisation of psychological resilience as development progresses.

Moderating Factors of Child Psychological Resilience and Wellbeing

Parental Warmth

Whilst foundational studies proposed 'exceptional child characteristics' led to a state of 'invulnerability' (Garmezy & Nuechterlein, 1972) children do not merely exit the womb

with 'ready-made' resilience. Although individual factors such as temperament and cognitive skills are critical in maintaining psychological equilibrium following adversity (Deater-Deckard, Ivy & Smith, 2013), characteristics of the child's attachment-based relationships are identified as pivotal predictors of resilience (Brennan, Le Brocque & Hammen, 2003; Conger & Conger, 2002; Rohner & Britner, 2000).

Parental warmth (comprised of both physical and emotional components) (Parker, Tupling & Brown, 1979) is commonly identified as a key influence on child wellbeing (Cox, 2003; Eisenberg, Lennon & Roth, 1983; Scaramella, Conger, & Simons, 1999). Physical parental warmth is defined as the provision of appropriate physical affection (i.e. hugging and kissing) whereas emotional warmth involves attending to the child's emotional needs with praise, positive affect, affection and admiration directed towards the child, their activities and accomplishments (Amato, 1990; Davidov & Grusec, 2006; Maccoby & Martin, 1983). Evidence suggests parenting which is sensitive, responsive, and accepting partially protects children at risk of developing emotional and behavioural difficulties from encountering such outcomes (Conger & Conger, 2002; Landry, Smith & Swank, 2003). Higher parental warmth has been associated with higher self-esteem, fewer internalising and externalising problems, greater academic competence in adolescence and appears to stimulate problem-focused coping (Egeland, Weinfield, Bosquet, & Cheng, 2000; McIntyre & Dusek, 1995; Scaramella et al., 1999). Contrarily, low parental warmth has been associated with feelings of alienation, child hostility and aggression, greater behavioural and emotional problems and risky behaviours (Young, Miller, Norton, & Hill, 1995; Etkin, Koss, Cummings & Davies, 2014).

Landry and colleagues (2003) found consistent parental warmth in early childhood predicted faster cognitive and social growth at 8 years for preterm and term children. Preterm children were, however, more sensitive to the consistency of parental warmth, demonstrating greater competence when levels were high compared to term peers. When parents exhibited

consistently minimal warmth, preterm children demonstrated poorer social functioning than term peers encountering the same parenting characteristics (Landry et al., 2003). As the potential negative impact of minimal parental warmth was greater for preterm than term children, parental warmth may be more important in promoting adaptive functioning and psychological wellbeing in preterms compared to term peers. Correspondingly, Faure and colleagues (Faure et al., 2017) found maternal sensitivity at 18 months significantly predicted internalising problems at 11 years in VPT but not term born. VPT respondents with sensitive mothers displayed comparable internalising symptom profiles to term peers (Faure, et al., 2017). In view of these findings, parental warmth may continue to be of greater importance in facilitating psychological resilience and wellbeing at times of adversity for preterm compared to term populations during the adolescent period.

Parental Psychopathology

Capacities of a parent to provide such emotional attention is often impeded, with parental psychopathology seen to disrupt the parent-child relationship and facilitation of positive child wellbeing (Papp, Cummings, & Goeke-Morey, 2005). Parental psychological distress has been reliably associated with adjustment problems in the parented child (Connell & Goodman, 2002), most notably depression and anxiety (Cummings & Davies, 1994). Beidel and Turner (1997) demonstrated children of parents with an anxiety, depressive or comorbid diagnosis were more likely to encounter associated psychopathology than peers with non-disordered caregivers. Radke-Yarrow and colleagues (1992) found children with ‘affectively ill’ mothers reported greater depressive symptoms at a three-year follow-up compared to those with ‘affectively healthy’ mothers (Radke-Yarrow et al., 1992).

Research has indicated mothers of infants born premature experience greater levels of psychological distress in the neonatal period than mothers of infants born at full gestation

(Blumberg, 1980; Singer, Davillier, Bruening, Hawkins & Yamashita, 1996) with increased risks of maternal depression and parenting stress (Singer, Salvator, Guo, Collin, Lilien & Baley, 1999). Treyvaud, Lee, Doyle and Anderson (2014) recently found parents of children born premature were more likely to report moderate-severe anxiety symptoms, greater depressive symptoms and higher levels of parenting stress than term born parents when children were seven years of age.

Heightened parental stress and uncertainty resulting from the infant's medical vulnerabilities has been hypothesised as keeping parents in a heightened state of arousal in the months and even years following the premature birth (Lasiuk et al., 2013). With prior research indicating prematurity may compound the impacts of parental psychopathology on the emotional and psychological wellbeing of the child (DeMier, Hynan, Harris & Manniello, 1996; Shaw et al., 2006), it is important to consider the possible influence of such symptomatology on the development of internalising problems at critical stages of the lifespan. Given these findings, parental psychopathology amongst preterm and term adolescents may incite poorer psychological functioning and thus interfere with the child's ability to maintain psychological equilibrium in the adjustment to the various biological and social changes of adolescence.

Current Study

Despite recent developments, questions regarding the level of psychological wellbeing and resilience at the transition to adolescence of preterm children remain to be answered. Psychological coping established during the adolescent period is posited to have long lasting effects on future wellbeing (Sawyer et al., 2012; Vederhus et al., 2015). Demonstrating a stable trajectory of functioning in the face of compounding adversity of preterm birth and transitional adolescent processes would reflect resilience. Given preterm

children are shown to experience poorer psychological outcomes compared to term peers (McGowan et al., 2011; Moster et al., 2008) examination of the state of psychological resilience and wellbeing following adolescence is important in informing early intervention practices.

This paper uses data from a large Australian population study to investigate psychological resilience and wellbeing across the transition to adolescence. Specifically, the association between gestational period and the severity of the internalising symptoms (depression, anxiety and peer problems) and at ages 14-15 years compared to 10-11 years was examined. The effect of gender and parental warmth on internalising problems and their interactions with prematurity classifications were also examined controlling for internalising problems in middle childhood (10-11 years), parental psychopathology, neonatal risk, socioeconomic status, pubertal maturation and stressful life events.

The following hypotheses were proposed: i) Severity of prematurity will be predictive of lower stability of internalising symptoms from 10-11 years of age to 14-15 years of age with higher stability reflective of greater resilience and psychological wellbeing; ii) Female adolescents born prematurely will have higher rates of internalising symptomatology than male adolescents born prematurely and female adolescents born at term; and iii) Parental warmth will moderate the relationship between gestational age and stability in internalising problems, such that it will be more protective for preterm relative to term adolescents.

Method

Participants

This paper utilised data collected as part of the *Growing Up in Australia: Longitudinal Study of Australian Children (LSAC)* (AIFS, 2004). The national study commenced in 2004 with an infant B-Cohort of 5112 0-1 year olds and child K-cohort of

4991 4-5 year olds. Conducted conjointly by the Department of Social Services, Australian Institute of Family Studies and the Australian Bureau of Statistics, the sample was drawn from the National Medicare Database. Data is collected every two years via face to face interviews and psychometric questionnaires with Wave 8 commencing in 2018.

This paper utilised data for a total of 3090 children from the K-cohort whose gestational age was reported by parents at Wave 1 ('very preterm' (VPT) $n = 44$, 'moderate preterm' (MPT) $n = 195$ and 'term' $n = 2851$) and who continued in the study at ages 10-11 years (Wave 4) and 14-15 years (Wave 6). The three groups were comparable on age, gender and SES. No significant differences were observed between the groups on parent respondent gender, age, and employment status or qualification level. Respondent demographics are shown in *Table 1* based on information collected at Wave 6.

Ethical approval for *LSAC* was provided by the Australian Institute of Family Studies Ethics Committee with informed written consent granted by the parent/caregiver of each participating child.

Table 1

Respondent Demographics

	Very Preterm n (%)	Moderate Preterm n (%)	Term n (%)
Total sample	44	195	2851
Child mean age*	14.29	14.40	14.41
Primary parent mean age*	45.90	45.43	45.56
Female child respondents	22 (50%)	94 (48%)	1418 (49%)
Female Primary Parent	46 (90.2%)	188 (93.5%)	2811 (93.4%)
High Neonatal Risk	41 (93.20%)	129 (66.20%)	311 (10.90%)
Parent Employment Status			
Employed	40 (93%)	163 (84%)	2434 (82%)
Not in workforce	4	30	401
Primary Parent Income Level			
25,000 or less per year	21 (47.72%)	84 (43.75%)	1189 (42%)
26,000 – 51,999 per year	10	49	765
52,000 – 103,999 per year	10	51	713
104,000 or more per year	0	8	164

*Mean child and parent age measured in years

Measures

Gestational Duration

Gestational duration was defined by parent report of the time from the first day of the mother's last menstrual period to the day of infant's birth. Gestational age was categorised into 'VPT' (≤ 32 weeks), 'MPT' (33 to ≤ 36 weeks) and 'term' (37 to ≤ 41 weeks) based on WHO guidelines (WHO, 1992). Gestational duration was reported in number of weeks by the target child's parent/caregiver at ages 4-5 (Wave 1).

Parental Warmth

This paper utilised the LSAC Parental Warmth measure (Child Rearing Questionnaire; Paterson & Sanson, 1999). Parental warmth was measured on a 5-point Likert scale (1, 'Never' to 5, 'Always') using the following 6 items: How often do you express affection by hugging, kissing and holding this child? How often do you hug or hold this child for no particular reason? How often do you tell this child how happy he/she makes you? How often do you have warm, close times together with this child? How often do you enjoy listening to this child and doing things with him/her? How often do you feel close to this child both when he/she is happy and when he/she is upset? A composite measure of parental warmth was calculated using the proportionally adjusted factor score regression weights reported in the LSAC Parenting Measures Technical Report (Zubrick, Lucas, Westrupp & Nicholson, 2014). A congeneric model was specified, and consistent with Hu and Bentler (1995; 1998; 1999) the principal model fit index was the Standardised Root Mean Residual (SRMR) and was used in conjunction with one of two other indices: the Non-Normed Fit Index (NNFI) and the Comparative Fit Index (CFI). The model was deemed to have an acceptable fit where SRMR was less than 0.10 with the NFI and/or the CFI at less than 0.90. The final model was acceptable ($SRMR = 0.07$; $CFI = 0.97$). Item loadings ranged from

0.707 to 0.854 with excellent scale reliability (0.92). A higher composite score was indicative of greater parental warmth. Scores were further coded into three categories: 'Low Warmth' (0-2), 'Moderate Warmth' (2.1-4.0) - and 'High Warmth' (4.1-5.0). Parent scores obtained at 14-15 years (Wave 6) were utilised.

Outcomes

Depression and Anxiety Disorders

Parent respondents were directly asked whether their child had experienced 'ongoing' depression or anxiety disorder for a minimum of two weeks up to a period of two years. No formal psychiatric diagnosis was needed for the 'yes/no' response. Parents were additionally required to rate the severity of their child's depression or anxiety on a 3-point scale (1; 'Mild', 2; 'Moderate' or 3; 'Severe'). Such questions were asked at both ages 10-11 years (Wave 4) and 14-15 years (Wave 6). Responses from both time points were used in this paper.

Internalising Psychopathology

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is a 25-item self-report measure identifying behavioural and emotional problems in children and adolescents and includes 5 subscales: Behavioural problems, Hyperactivity, Emotional symptoms, Peer problems and Prosocial behaviour. The questionnaire comprises a number of statements about the child's behaviour in the previous 6-months with response options 'Not True', 'Somewhat True' and 'Certainly True' (Goodman, 1997). The score range is from 0 to 10 for all scales with 5 items on each scale scored from 1 ('Not True') to 3 ('Certainly True').

Parent-report forms are used for children aged 3-16 years and a youth self-report for adolescents 11-16 years. SDQ demonstrates sound internal consistency across scales and nationalities with a coefficient range 0.75-0.86 (Hawes & Dadds, 2004; Mellor, 2005; Muris,

Meesters & van den Berg, 2003). Adequate concurrent and discriminant validity is demonstrated across British and European populations (Goodman & Scott, 1999; Muris, et al., 2003; Koskelainen, Sourander & Kaljonen, 2000). The measure has demonstrated comparable reliability and validity to the Child Behaviour Checklist at less than one quarter the length (Achenbach, 1991; Goodman & Scott, 1999).

The parent and youth self-report SDQ were administered during Wave 1 to 6. An Internalising score was computed by summing the 5 emotional and 5 peer problems subscale items with a possible total score ranging from 0 to 20. Items on the Emotional Symptoms Scale assess frequency of display of negative emotional states (e.g. nervousness, worry). Items on the Peer subscale assess ability to form positive relationships with other children. Amalgamation of these two subscales scores to estimate total internalising problems is recommended for community samples (Goodman & Goodman, 2009). Higher internalising scores indicate greater difficulties. SDQ scores are typically used as a continuous measure in community samples (Goodman & Goodman, 2009) and therefore were used as such in this paper.

Internalising problem scores were generated for respondents at 10-11 years (Wave 4) and 14-15 years (Wave 6). Problems at 10-11 years (Wave 4) were used as a baseline measurement of psychopathology allowing analysis of resilience and psychological wellbeing to be made at adolescence using scores obtained at 14-15 years (Wave 6). Only child report data was utilised in the current study.

Covariates

Neonatal Risk

Neonatal Risk was computed from birth data collected at age's 4-5years in Wave 1. Categories of 'High Risk' and 'Low Risk' were generated based on child admission to

Neonatal Intensive Care (NICU)/Special Care Nursery (SCN), use of ventilation or other life support assistance and presence of serious health condition immediately following birth. Adequate correlation was found between these variables with Spearman's $\rho = 0.68$, $p = .001$. The selection of these factors in generating a measure of neonatal risk was based on existing research (Austeng et al., 2010; Hobel et al., 1973; Shapiro-Mendoza et al., 2006) with high risk defined cumulatively based on affirmative responses to NICU/SCN admission, use of ventilation or life support technologies, presence of serious health condition/complication immediately following birth and undergoing lifesaving medical procedure. Affirmative response to three or more factors was classed as 'high' neonatal risk. As this study focused on the difference between internalising problems and psychological wellbeing amongst adolescents of differing prematurity, controlling for discrepancies in the level of additional medical care and procedures following birth was important. Given term child respondents were also able to be classed as 'high risk', controlling for impacts of differing levels of care subsequent to birth on future outcomes was conducted across the entire study sample.

Parental Psychopathology - Kessler 6 (K-6)

The K-6 is a 6-item brief self-report questionnaire measuring psychological distress on the anxiety-depression spectrum, identifying frequency and severity of related symptoms experienced in the past 30 days (Kessler et al., 2002). Parent respondents rated how often they felt nervous, hopeless, restless or fidgety, depressed, everything was an effort and worthless on a 5-point scale (1, 'None of the time' to 5, 'All of the time'). The K-6 screened for parent psychopathology at each data Wave. Parent K-6 responses provided at 14-15 years (Wave 6) were used in analysis.

Socioeconomic status (SES)

A measure of socioeconomic status was existent in LSAC with z score calculated for each respondent in determining their socioeconomic position in comparison to all other families. Yearly parent income was included in this paper as it is consistently demonstrated as indicative of SES (ABS; 2011; Duncan, Daly, McDonough & Williams, 2002).

Stressful life events

LSAC used the Life Events (LE) Scale (Dohrenwend et al., 1978) in assessing the experience of stressful life events in the past year. Parent respondents were asked about a list of specific stressful life events of the preceding 12 months and were to nominate any that applied or alternatively select 'none of the above'. Events included birth of a child/pregnancy, having suffered a serious illness, injury or assault (or a relative), death of parent, partner or child, death of other close relative, dissolution of 'steady' romantic relationship, have someone new enter the household, had serious problem with close friend, neighbour or family member, experienced major financial crisis, work-related crisis or major disappointment, threat of losing employment, loss of employment beyond personal control (i.e. redundancy, being fired), sought work unsuccessfully for a month or more, problems with the police or courts, something valued was stolen or lost and someone in household had drug or alcohol problem. The Stressful Life Events Scale score, ranging from 1 ('None') to 15 ('Experienced all'), obtained at 14-15 years (Wave 6) was taken as a proxy for the experience of stressful family circumstances over the previous 12-month period.

Pubertal Maturation at 10-11 years and 14-15 years

Child respondents were questioned about pubertal maturation via the Pubertal Development Scale (PDS, Crockett & Petersen, 1987). The PDS assessed pubertal stage based on a number of typical physical indicators of puberty including growth spurt, growth of

body hair, skin changes, growth of facial hair (males) and breast growth (females) rated on a 4-point scale ranging from 1 ('Not yet begun') to 4 ('Completed'). A mean composite score was then generated based on the sum of these items as appropriate for gender.

Commencement of menstruation additionally informed puberty status for females. Pubertal maturation scores were established for respondents at age 10-11 years (Wave 4) and 14-15 years (Wave 6).

Analytical Approach

Analyses were conducted using IBM SPSS, version 22 (IBM Corp, 2013). Descriptive statistics were generated for all outcome and factor variables. A chi-square analysis was planned in evaluating the significance of association between gestational period and new occurrences of depression and anxiety disorders between childhood at 10-11 years (Wave 4) and adolescence at 14-15 years (Wave 6) with subsequent chi-square analyses for females and males done separately

A 3x2x3 factorial ANCOVA was completed to determine main effects of gestational period, gender and parental warmth on internalising problems at 14-15 years. Interactions between independent factors gestational period, gender and parental warmth were also evaluated. Internalising problems at age 10-11 years served as a baseline of psychological functioning to which psychopathology at 14-15 years was compared and as such was entered into the model as a covariate. Controlling for possible confounding effects of parental psychopathology, socio-economic status, neonatal risk, pubertal maturation and stressful life events was undertaken based on existing literature and the aims of this paper to explore the unique effects of gestational period, gender and parental warmth and their interactions on psychological resilience at adolescence.

Results

Psychological Resilience and Wellbeing: Internalising Psychopathology

VPT, MPT and term respondents demonstrated comparable incidence of new internalising disorders at 14-15 years for those without a diagnosis at 10-11 years. A Chi-Square analysis found no significant association between gestational period and onset of new cases of depression or anxiety disorder at 14-15 years for those who were not identified as having an anxiety disorder or depression at 10-11 years ($\chi^2(2) = .395, p = .821$). No significant association was found for female ($\chi^2(2) = .452, p = .798$) or male respondents ($\chi^2(2) = 2.60, p = .273$) across the gestational periods. A significant association was found for gender and onset of new cases of depression or anxiety disorder at 14-15 years for those who were not identified as having depression or anxiety disorder at 10-11 years ($\chi^2(1) = 22.845, p = .000$). Female respondents who had not encountered depression or anxiety at 10-11 years were at 1.69 greater risk (95% CI [0.72-1.80]) of developing a disorder at 14-15 years than male peers (Table 2).

Table 2

New cases of Anxiety and Depression at 14-15 years by gender

	n	% total sample	Relative Risk	95% CI	Sig.
Male	116	3.6 %	-	-	-
Female	194	6.1%	1.69*	0.72-1.80	.000

*Relative risk compared to male peers

Table 3 presents the non-adjusted means and standard deviations for the internalising score at 10-11 and 14-15 by gestational group and gender and level of parental warmth. Overall, both total term and MPT child-report mean SDQ internalising scores decreased at adolescence whilst the VPT child-report score marginally increased (Table 3). Positive

changes in internalising symptoms observed for both term and MPT respondents may signify greater resilience than VPT respondents who reported slight increased problems, providing support for predictions VPT respondents would demonstrate greater internalising problems at adolescence.

Table 3

Mean Child Reported Internalising problems at 10—11 years and 14-15 years

	Gestational Period																	
	Very Preterm (< 32 weeks)						Moderate Preterm (33-36 weeks)						Term (37-41 weeks)					
	Females (n =21)		Males (n = 23)		Total (n =44)		Females (n = 89)		Males (n =102)		Total (n = 191)		Females (n =1418)		Males (n =1433)		Total (n = 2851)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
10- 11 years																		
Low Warmth	-	-	-	-	-	-	6.00	1.41	-	-	6.00	1.41	5.50	3.51	5.13	2.30	5.25	2.60
Moderate Warmth	6.33	2.07	5.73	3.55	5.94	3.05	4.63	3.51	5.27	4.01	5.01	3.81	4.80	3.19	4.86	3.61	4.83	3.42
High Warmth	3.80	3.57	3.42	2.64	3.63	3.14	5.22	3.65	4.83	4.08	5.03	3.92	4.58	3.25	4.63	3.36	4.60	3.30
Total	4.52	3.27	4.52	3.26	4.52	3.27	5.02	3.65	5.04	4.03	5.03	3.85	4.67	3.23	4.74	3.48	4.70	3.35
14- 15 Years																		
Low Warmth	-	-	3.00	0.00	3.00	0.00	4.00	5.66	-	-	4.00	5.56	4.50	3.01	4.13	0.99	4.25	1.81
Moderate Warmth	7.66	4.63	3.11	3.06	4.94	4.28	5.58	3.86	3.92	3.09	4.59	3.50	5.65	3.79	3.85	3.11	4.66	3.55
High Warmth	5.44	4.19	3.00	2.04	4.39	3.60	5.63	4.08	3.60	3.43	4.66	3.91	5.32	3.62	3.47	2.92	4.45	3.43
Total	6.05	4.33	3.05	2.40	4.54	3.78	5.57	3.99	3.75	3.26	4.63	3.73	5.44	3.68	3.65	3.00	4.54	3.47

Explanatory Model: Effects of Gestational Period, Gender and Parental Warmth

A 3x2x3 between groups factorial analysis of covariance was conducted to assess the effect of gestational period, gender and parental warmth on resilience and psychological wellbeing at adolescence. The independent factors were gestational period (*VPT* [≤ 32 weeks gestation], *MPT* [33-36 weeks gestation]) and *term* [37-41 weeks gestation]), gender (*female* and *male*) and parental warmth (*low warmth*, *moderate warmth* and *high warmth*). The dependent variable was child-report total internalising problem score obtained at 14-15 years. The child-report internalising problem score obtained at age 10-11 years was used as a covariate to control for baseline psychopathology. Parental psychopathology, neonatal risk, socioeconomic status, pubertal maturation and stressful life events were included as covariates to control for their associations. Preliminary checks were conducted to ensure assumptions of normality, linearity, homogeneity of variances and regression of slopes and reliable measurement of the covariates.

After adjusting for the covariates of internalising problems at 10-11 years, parental psychopathology, SES, neonatal risk, pubertal maturation and stressful life events, significant main effects were found for gestational period, $F(2, 915) = 4.461, p = .012, \eta_p^2 = .01$ and gender, $F(1, 915) = 17.238, p = .000 (\eta_p^2 = .02)$ (Table 4). The main effect of parental warmth did not reach statistical significance, $F(2, 915) = 1.696, p = .184$. Significant interaction effects were found between gestational period and gender, $F(2, 915) = 3.234, p = .040 (\eta_p^2 = .007)$ and gender and parental warmth, $F(1, 915) = 4.822, p = .028 (\eta_p^2 = .005)$. The interaction between gestational period and parental warmth did not reach statistical significance, $F(2, 915) = 2.336, p = .097$. No significant interaction was observed between gestational period, gender and parental warmth, $F(2, 915) = 2.635, p = .072$.

Table 4

Main and Interaction effects of gestational period, Gender and Parental Warmth

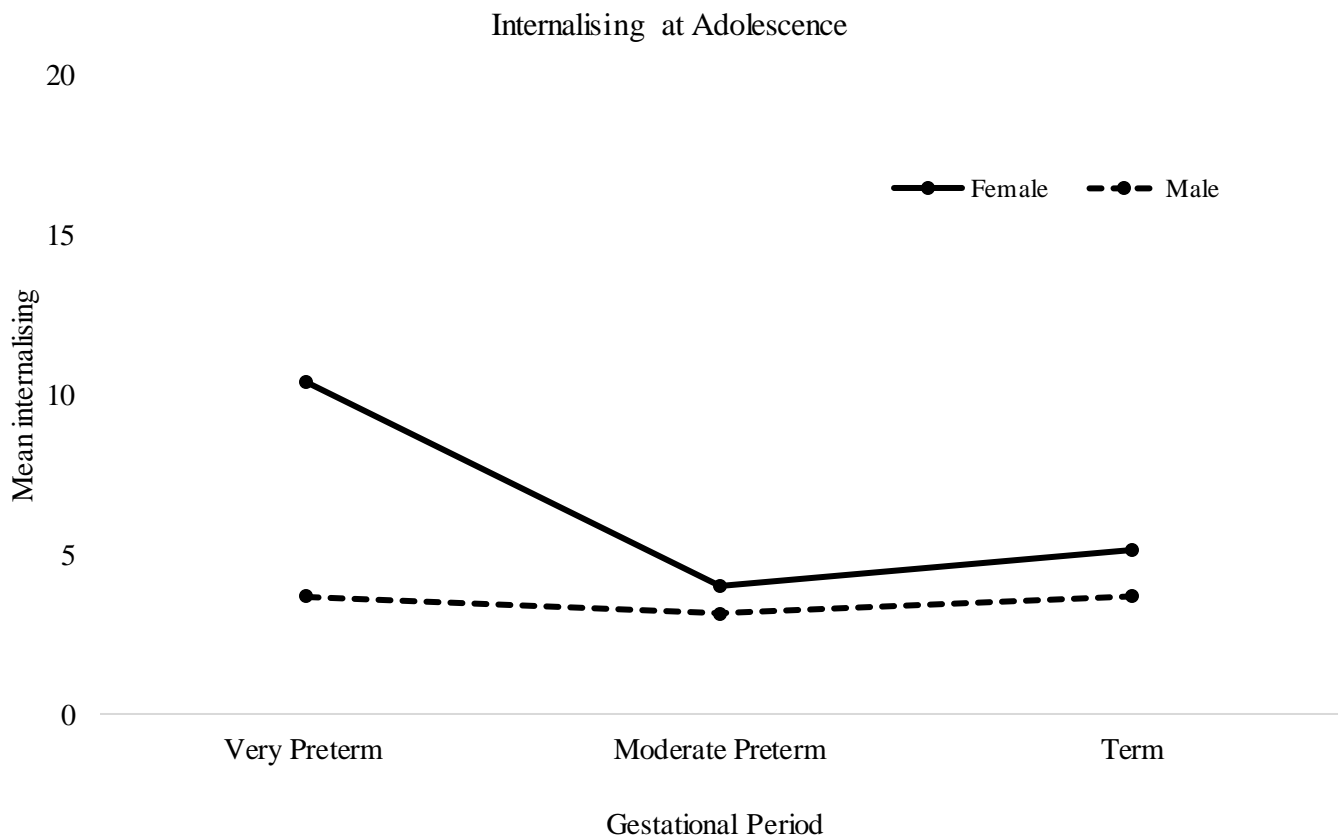
Source	Sum of Squares	df	Mean Square	F	Partial Eta Squared (η_p^2)
Gestational Period	84.728	2	84.728	4.461*	.010
Gender	163.694	1	163.694	17.238**	.018
Parental Warmth	32.217	2	32.217	1.696	.004
Gestational Period by Gender	61.413	2	61.413	3.234*	.007
Gestational Period by Parental Warmth	44.370	2	44.370	2.336	.005
Gender by Parental Warmth	45.788	1	45.788	4.822*	.005
Gestational Period by Gender by Parental Warmth	50.050	2	50.050	2.635	.006
Internalising 10-11years	1752.303	1	1752.303	184.528**	.168
Parental Psychopathology	32.181	1	32.181	3.389	.004
Socioeconomic status	1.114	1	1.114	0.117	.000
Neonatal Risk	12.524	1	12.524	1.319	.001
Pubertal Maturation	42.113	1	42.113	4.435	.005
Stressful Life Events	44.285	1	44.285	.039	.000
Error	8698.477	915	9.496		

*p < 0.05 ** p < 0.01 Adjusted R = 0.297

Associated planned pairwise comparisons revealed significant mean differences for internalising problems at adolescence between VPT and term respondents (*mean difference* = +2.752, $p = .044$, 95% CI [0.050-5.453]) and VPT and MPT respondents (*mean difference* = +3.370, $p = .014$, 95% CI [0.529-6.210]). No significant difference was found between MPT and term (*mean difference* = -0.618, $p = 1.00$, 95% CI [-2.279-1.04]). These results suggest VPT internalising problems were substantially higher at adolescence than their term and MPT peers after controlling for level of internalising problems at 10-11, indicating lesser psychological wellbeing and resilience at this time period compared to the other gestational groups.

The mean difference between female and male internalising problems was significant at $p \leq .001$ (*mean difference* = +2.610, $p = .001$, 95% CI [1.111-4.109]). Female respondents experienced greater internalising problems at adolescence than male peers. Further, a significant interaction between gestational period and gender revealed females born prematurely respondents had greater internalising problems at adolescence than males born prematurely (Figure 1). VPT female respondents experienced the greatest severity of internalising problems at adolescence (*marginal mean* = 10.392, $SE = 1.473$, 95% CI [6.972-13.812]); over 2.5 times that of male VPT peers.

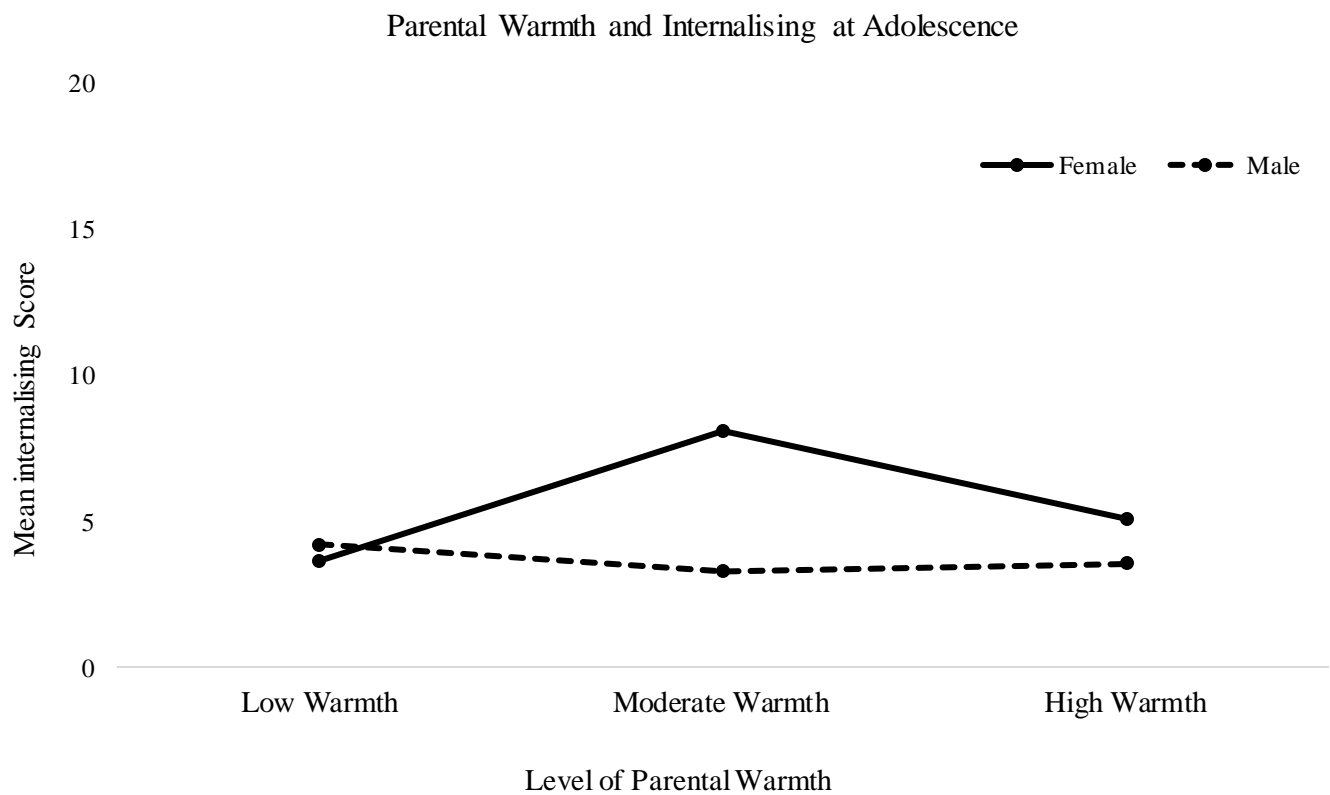
Figure 1

Adolescent patterns of internalising problems - Gestational period and gender patterns

The significant interaction between gender and parental warmth revealed that parental warmth moderated the relationship between gender and internalising problems. As can be seen in Figure 2 a gender difference in internalising problems was not evident for youth whose parents' showed low warmth but was for those with parents of moderate warmth.

Figure 2

Adolescent patterns of internalising problems - Parental warmth and gender patterns



Discussion

The primary aim of this paper was to examine the effect of gestational period on internalising problems at age 14-15 years, indicative of psychological resilience and wellbeing across the transition to adolescence. The study also examined the effects of gender and parental warmth, and their interactions with gestational period on adolescent internalising problems.

Three major findings emerged from the current study. Firstly, gestational period and gender significantly impacted the stability of psychological functioning from childhood to adolescence, as measured by magnitude of internalising problems at age 14-15 years. A

significant interaction was observed between gestational period and gender as well as between gender and parental warmth. No statistical meaningful interaction was observed between gestational period and parental warmth or gestational period, gender and parental warmth.

As predicted, greater severity of prematurity was associated with poorer psychological resilience and wellbeing at adolescence, with VPT respondents demonstrating a significant increase in internalising problems from late childhood to adolescence compared to the other two groups. Patterns of internalising within the VPT sample were similar to trends demonstrated in previous research with samples of children born less than 32 weeks gestation shown to experience poorer psychological outcomes and higher rates of internalising disorders across childhood and adolescence (Burnett et al., 2011; Westrupp et al., 2012). Given the present results and previous research, it may be conceivable that VPT respondents encounter lower psychological stability than peers of later gestations following the transition to adolescence.

Secondly, significant differences were found between female and male respondents, with females demonstrating greater internalising problems at adolescence across all three gestational periods. Significant gendered outcome differences replicated existing empirical evidence demonstrating significantly higher internalising problems in adolescent females compared to males (Ge, Conger, Lorenz, Shanahan & Elder, 1995; Lewinsohn, et al., 1994; Petersen, Sarigiani, & Kennedy, 1991). Internalising gradients for females and males paralleled those demonstrated by Scaramella and colleagues (1999) adolescent sample of non-specified gestation. Based on the internalising outcome scores, the featured sample of males appeared to experience greater psychological resilience and wellbeing following the transition to adolescence than female counterparts. It is important to consider that as males may be more inclined to express distress as aggression or antisocial behaviour (Gjerde, Block

& Block, 1988; Arnett, 2014), the present findings of lower internalising problems comparative to female peers may misrepresent the stability of psychological wellbeing as externalising behaviours were not evaluated.

The significant interaction observed between gender and gestational period is of particular interest. The pattern of change in internalising difficulties from term to MPT was comparable for females and males however diverges significantly for VPT respondents. VPT females demonstrated internalising problems over two and a half times that of their male counterparts and a considerable increase from MPT females. These findings were consistent with the prediction that co-occurrence of female gender and VPT birth would present a cumulative risk of greater internalising problems at adolescence, impeding capacity to maintain an equilibrium of psychological wellbeing.

Significantly higher adolescent internalising problems demonstrated by VPT females implies this subgroup may experience lower psychological resilience and wellbeing following transitions to this developmental life stage. Whilst not unexpected given the cumulative risk of being both female *and* VPT (characteristics which on their own consistently predict internalising psychopathology), the magnitude of change between VPT, MPT and term is non-linear. If the instability of psychological wellbeing at adolescence experienced by VPT females was merely the additive effect of prematurity severity with being female, MPT females by convention should have experienced lower levels of internalising compared to VPT but higher levels than term females with comparable magnitudes of change between the three gestational periods. As Figure 1 illustrates, this was not the case; MPT females experienced marginally *lower* internalising problems than term females with a steep incline in internalising from MPT to VPT. This suggests something distinct about VPT females may be driving increased internalising psychopathology at adolescence.

The Foetal Origins theory (Barker, 1998) may offer some explanation. It posits that an unfavourable foetal environment can affect vulnerability to significant diseases later in life (Barker, 1998; Barker, Eriksson, Forsen & Osmond, 2002), with recent research identifying vulnerabilities to psychopathology, notably depression (Bellingham-Young & Adam-Macedo, 2003; Costello, Worthman, Erkanli & Angold, 2007). With suboptimal intrauterine growth a prime example of unfavourable foetal circumstances, associated literature has consistently found low birth weight to be predictive of adolescent and adult depression in female samples (Bellingham-Young & Adamson-Macedo, 2003; Costello et al., 2007; Wojcik, Lee, Colman, Hardy & Hotopf, 2013). Given intrauterine growth retardation generates risk for psychiatric difficulties at different developmental stages for females, it is conceivable to hypothesise a similar effect may be observed for VPT females, as demonstrated in the present study. VPT birth presents foetal adversity as exposure to the extrauterine environment at an extremely inopportune time inhibits the completion of adequate development. VPT birth may exacerbate liability to illness at later times of heightened stress or transition, as early biological ‘programming’ of hormonal systems and genetic material has been disturbed (Lucas, Fewtrell, & Cole, 1999). Previous findings have indicated maturation of core hormonal systems such as the hypothalamic-pituitary-adrenal (HPA) axis progress with gestational age (Worthman & Kuzara, 2005; Schlotz & Phillips, 2009). Alterations to the neuroendocrine architecture may therefore occur as shorter gestational durations of VPT children prevent full maturation of these somatic structures and potentially alters templates for later responsiveness of the HPA axis and related systems at sensitive time points (Phillips, 2007).

Early brain alterations associated with VPT birth threaten the typical trajectory of brain development and affect later emotional and social development (Montagna, & Nosarti, 2016). It may be that in females, VPT birth acts as a distinct adversity and amplifier of

gender and other risk factors in amplifying sensitivity to stresses at critical time points. Initial misconfigurations of neurotransmitter and hormonal systems in VPT females may later interact with sex-based biological and sociocultural predispositions to occasion a greater propensity toward internalising psychopathology in times of adversity or transition, as demonstrated in low birth weight females following puberty (Costello et al., 2007).

Whilst not evaluated in the current study, higher parental stress and social defeat or marginalisation have shown to be predictive of socioemotional problems in VPT females more so than MPT and term peers with lower perceived social support and greater feelings of inferiority (Spittle et al., 2009; Zelkowitz et al., 2011). Social defeat has been associated with increased sensitisation of the dopaminergic system in both females and males with altered stress responses (i.e. inhibited or increased stress-induced dopamine release) occasioning increased psychopathology risk (Montagna, & Nosarti, 2016). It may be that such factors concomitantly contributed to the unique psychological disequilibrium of VPT females in the current sample. Conclusions cannot be drawn about the effect of atypical neurodevelopment and interactions with other environmental risk factors in the present sample, however acknowledgement of such influences informs directions for further research into the mechanisms driving possible psychological disequilibrium in VPT female adolescents.

Parental warmth was hypothesised to be predictive of stability of psychological wellbeing in preterm respondents. Although the main effect of parental warmth was not significant, it was moderated by gender. As Figure 2 illustrates, low warmth was associated with the highest rate of internalising across males compared to moderate warmth being associated with the highest rate across female respondents. Females exposed to high and moderate parental warmth were shown to experience higher internalising problems.

Too few preterm respondents in the low warmth group restricts the ability to make inferences about the potential buffering effect of the parenting characteristic at this level.

The absence of a significant association between gestational period and parental warmth was somewhat surprising given patterns in existing research (Estroff, Yando, Burke, & Snyder, 1994; Etkin et al., 2014; Miles, Holditch-Davis & Shepherd, 1998). Previous studies have consistently indicated early parenting influences the socioemotional functioning of preterm and term children (Beckwith, Rodning & Cohen, 1992; Goldberg & DiVitto, 1995; McGrath, Sullivan & Seifer, 1998). Parenting a preterm is described as uniquely complex, with tendencies for overprotectiveness and lowered expectations of functioning stemming from perceptions of the child as exceedingly vulnerable (Estroff et al., 1994; Miles, Holditch-Davis, and Shepherd, 1998). Preterm preschoolers' have been described as 'weaker' and 'more vulnerable' than their peers by their mothers who additionally see themselves as more attentive than mothers of term children (Miles & Holditch-Davies, 1997). There is some evidence suggesting no significant difference of parental responsiveness and warmth on child outcomes as it is displayed toward preterm and term children (Eiser, Eiser, Mayhew & Gibson, 2005). Eiser and colleagues' (2005) finding indicate the outcome of the present study may be more than an empirical anomaly. The question remains as to why the pattern exhibited by the present sample may vary from existing literature.

One difference between the present sample and previous studies is the targeted developmental period. Previously, the effect of parental warmth on preterm outcomes has been assessed primarily during infancy, toddlerhood and middle childhood (Harrison, 1990; Harrison & Magill-Evans, 1996; Miles & Holditch-Davies, 1997). The current study focused on parental warmth and psychopathology as experienced at adolescence. It may be that the buffering effect of parental warmth on preterm populations is more apparent during the earlier stages of life as child vulnerability and functional deficits experienced are more

palpable to parents and practitioners (Allen et al., 2004; Aylward, 2002; Goldberg & DiVitto, 1995). As preterm children experience a 'catch up' in physical growth as adolescence nears (Knops et al., 2005; Niklasson et al., 2003), semblance to term peers surges as does parental acknowledgement of the child's strengths and capacities to thrive despite their preterm status (Jackson, Ternstedt & Schollin, 2003). This may occasion changes in how parental warmth and responsiveness is conveyed and received in preterm populations, such that it does not differ significantly from term populations.

Furthermore, parenting demands during adolescence are considerably different to those encountered in parenting a young child, as increasing bids for autonomy incites an overhaul of the parent-child dynamic (O'Connor, 2002). Beckwith and colleagues (1992) evaluation of consistency and discontinuity of maternal warmth towards preterm children from infancy to 12 years found maternal warmth to be dynamic, with definitions and enactments changing at each developmental time period (i.e. infancy, early childhood and preadolescence). Within *LSAC*, parental warmth at each Wave, and thus developmental stage, is assessed using the same psychometric measure. Whilst this ensures reliability across time, it may have limited the ability of this study to identify components of parental warmth unique to the preterm (or term) population during the adolescent period.

As previously emphasised, adolescence is a time of significant social adjustment. Increased autonomy alters the dynamic between child and primary attachment figure (Ryan & Lynch, 1989; Silverberg & Gondoli, 1996; Spear & Kulbock, 2004). Social support and reassurance is sought more readily from peers than parents (Arnett, 2014; Gifford-Smith, Dodge, Dishion & McCord, 2005), with cohesive friendships and social inclusion insulating emotional distress and promoting psychological resilience (Damon & Lerner, 2008; Hymel et al., 1990; Gazelle & Rudolph, 2004; Rubin et al. 2004). Socialisation increases in complexity in adolescence with pursuit of social dominance and acceptance. It is conceivable then that

pre-existing socioemotional vulnerabilities become more discernible at this time and thus social rejection and acceptance act as potentiators for psychopathology. As the intricacy of the adolescent's social milieu increases pre-existing deficits in sociability may intensify particularly in preterm populations who demonstrate poorer social competence from childhood (Spittle et al., 2009).

Given the increased strength of peer influence at the targeted time of adolescence, it may be that peer warmth and acceptance are of greater consequence to psychological wellbeing, and thus surpasses the effect of parental warmth observed during the infancy and childhood periods. As sociability of preterm and term children appear to differ at adolescence (Moster et al, 2008; Saigal et al., 2003), it may be that quality of peer relations is an even greater insulating or aggravating factor on adolescent psychological resilience than parental warmth was proposed to be. As peer social support and warmth were not evaluated in this study, the above conjectures require further empirical investigation.

The non-significant interaction between gestational period and parental warmth may also be attributable to attrition of more vulnerable respondents at earlier data Waves. Those who dropped out at earlier points may have experienced differing levels of parental warmth than those remaining at the current Wave. This loss to study may have negated a significant interaction between parental warmth and gestational period. Limitations occasioned by sample attrition are discussed further hereafter.

Limitations

Whilst advancing knowledge regarding resilience and psychological wellbeing within an Australian preterm population during their transition to adolescence, important research limitations are acknowledged.

Firstly, despite the LSAC data being weighted at each Wave to remain representative of an Australian population, participant drop-out and cohort attrition across have biased the characteristics of the sample at the targeted time points. It may be that children who experienced greater adversity dropped out of LSAC prior to adolescence or that drop-out was associated with the child's gestational period or parents' warmth. Resilience of children who perhaps experienced greater adversities because of preterm birth (or otherwise), and consequently ceased partaking in the study was unable to be examined, and as such may have biased outcomes found for these populations in this paper. As differences in characteristics of respondents who were retained at wave 6 compared to those who dropped out at previous waves were unable to be determined across the gestational groups, extrapolating conclusions from the study to all preterm populations are completed with caveats about possible attrition biases in mind.

The presence of an anxiety or depressive disorder for the respondent child at either the childhood or adolescent time point was based primarily on parent report. Whilst parent report is a frequent source of information within the LSAC data set, using parent report alone in establishing the presence (or absence) of a psychological disorder in the respondent child may limit the validity and reliability of this phenomena. Soliciting information about a child from people who know that child best is a well-established data-gathering method alongside self-report. Given possible recall biases including recency and primacy effects impacting accuracy of parent report, use of the SDQ as a co-measure of child psychopathology was used in this study. This study aimed to counteract the limitations presented by use of any one data-gathering method by using multiple measures of the same behaviour in answering the key research questions.

The present findings demonstrate VPT, particularly females, may encounter lowered resilience and psychological wellbeing following the initial transition to adolescence.

However, absolute statements about the psychological resilience of VPT and MPT populations across the entirety of this developmental period cannot be made based on the two-time points evaluated in the study. Inferences regarding patterns of psychological resilience within preterm populations, are preliminary given internalising problems were evaluated at two-time points only. Evaluating stability of internalising problems at future age points (i.e. 16-17, 18-19 years) is needed for more conclusive inferences to be made.

The developmental aetiology of internalising psychopathology is complex, with interplays between various genetic, familial and environmental factors (Costello et al., 2003; Rapee, 1997; Zahn-Waxler, Klimes-Dougan & Slattery, 2000). Moreover, resilience is dynamic, operating in flux with changes in intra- and interpersonal contexts. Although socioeconomic status, parental psychopathology and experience of recent stressful circumstances were controlled in evaluating the effect of gestational period on at the transition to adolescence, other possible aetiological factors were not examined. Whilst prematurity was significantly influential on psychological resilience, evaluation of mechanisms ameliorating or aggravating this risk was beyond the aims of the study. Opportunities for further research exist in considering additional aetiological factors and the possible interactions with gestational status as the preterm population advances through the adolescent period (i.e. peer cohesion, bullying).

Furthermore, emotional and peer problems demarcated in the SDQ were used as indicators of internalising problems and associated resilience. This may have constrained the range of symptomatology assessed. Adolescent respondents were questioned for the first time at age 14-15 years about non-suicidal self-injury and suicidal ideation and behaviour. While inclusion of associated data was considered, there was no time point comparison. Escalation of suicide risk and related behaviours during young adulthood is well established (Gould et al., 1998; Johnson et al., 2002). As LSAC respondents enter later adolescence including self-

harm and suicide outcomes in the examination of resilience beyond 14-15 years would be particularly valuable in further informing patterns of resilience in preterm populations.

The selection of internalising problems as indicative of resilience may have biased female respondents. Given gendered differences in internalising and externalising psychopathology are well documented, focussing on internalising problems to the exclusion of externalising difficulties may inaccurately represent male psychological resilience at adolescence. As male adolescents demonstrate a proclivity toward aggressive and anti-social behaviour in expressing psychological distress (Bongers et al., 2004; Crick & Zahn-Waxler, 2003), examining changes in this behaviour may provide a more accurate indication of resilience (or dysfunction) in males populations than provided in the current study.

Concluding statements and clinical implications

Whilst medical advancements have afforded vast improvements in survival rates and functional capacities of preterm children, such populations remain at risk for poorer psychological outcomes across each developmental life stage. Such trends were confirmed in this paper with VPT birth associated with increased internalising difficulties at adolescence. Greater internalising problems during this developmental transition conceivably indicate lowered psychological resilience in this subgroup of children following a major developmental transition.

Female VPT adolescents appear most vulnerable to instability of psychological wellbeing when faced with the transition to adolescence, encountering the highest internalising psychopathology and greatest magnitude of change from middle childhood compared to females of greater gestational durations and all male peers. This study suggests VPT females may endure accumulative vulnerability towards internalising psychopathology following transition to a significant developmental life stage.

Overall, findings from this study are likely to be of benefit to health practitioners, parents and other professionals closely engaged with adolescence in enhancing awareness of psychological resilience within preterm populations. The clinical implications of such knowledge includes helping to inform preventative and early intervention practices for preterm populations in mitigating circumstances of ‘storm and stress’ by bolstering both child coping and peer and parent support capacities. Enhancement of community and school based mental health and wellbeing programs for children at the advent of and in the midst of the adolescence transition in specifically considering children who may have been born premature is a key clinical implication of the above findings. These preliminary findings may be of significant use in the reform of mental health awareness and education provided to teachers and mental health professionals in becoming more mindful of potential additional factors within their student and client populations impacting psychological wellbeing and stability at times of developmental transition.

Lastly, further investigations into the possible mechanisms driving the distinct pattern of psychological resilience and wellbeing in VPT female adolescents is recommended.

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Appendix A

Manuscript Submission Guidelines for *Development and Psychopathology*

Instructions for Contributors

Development and Psychopathology strongly encourages contributions from a wide array of disciplines because an effective developmental approach to psychopathology necessitates a broad synthesis of knowledge. Manuscripts will be considered that address, for example, the causes and effects of genetic, neurobiological, biochemical, cognitive, or socioemotional factors in developmental processes with relevance to various risk or psychopathological conditions. The journal also seeks articles on the processes underlying the adaptive and maladaptive outcomes in populations at risk for psychopathology.

Manuscript Review Policy

Manuscripts will have a blind review by at least two scholars. Every effort will be made to notify authors within 90 days of submission concerning the reviewers' recommendations and comments. *Development and Psychopathology* has no page charges.

Manuscript Submission and Review

All manuscript submissions to *Development and Psychopathology* must be made electronically via ScholarOne Manuscripts:

<http://mc.manuscriptcentral.com/dpp>

Please follow the complete instructions on this website to avoid delays. The instructions will prompt the author to provide all necessary information, including the corresponding author's contact information, which includes complete mailing address, phone and fax numbers, and an e-mail address. The website also requests suggested reviewers. The website will automatically acknowledge receipt of the manuscript and provide a manuscript reference number. The Editor-in-Chief will assign the manuscript to an Editor who will choose at least two other reviewers. Every effort will be made to provide the author with a rapid review. If the Editor requests that revisions be made to the manuscript before publication, a maximum of 3 months will be allowed for preparation of the revision. For additional information on the new online submission and review system, please read the Tutorial for Authors or the Tutorial for Reviewers available from ScholarOne Manuscripts.

Manuscript Preparation and Style

General. All manuscripts must be provided in MSWord format in 12-point type with 1-in. margins on all sides. The entire manuscript must be double-spaced and numbered consecutively. The language of publication is English.

Style and Manuscript Order. Follow the general style guidelines set forth in the *Publication Manual of the American Psychological Association* (6th ed.). The Editor may find it necessary to return manuscripts for reworking or retyping that do not conform to requirements. Do not use embedded references, end notes, or bookmarks. Manuscripts must be arranged in the following order:

Title Page. To facilitate blind review, all indication of authorship must be limited to this page, which should be submitted as a separate file. Other pages must only show the short title plus page number at the top right. The title page should include the (a) full article title; (b) name and affiliations of all authors; (c) acknowledgments; (d) mailing address and telephone number of the corresponding author; (e) address of where to send offprints, if different from the corresponding author; and (f) a short title of less than 50 characters.

Acknowledgments. These should be placed below the affiliations. Use this section to indicate grant support, substantial assistance in the preparation of the article, or other author notes.

Abstract Page. Include (a) a full article title, (b) an abstract of no more than 200 words, and (c) up to five keywords for indexing and information retrieval.

Text. Use a standard paragraph indent. Do not hyphenate words at the ends of lines or justify right margins.

References. Bibliographic citations in the text must include the author's last name and date of publication and may include page references. Examples of in-text citation style are Cicchetti (2002), Durston (2008, pp. 1133–1135), Hunt and Thomas (2008), (Hunt & Thomas, 2008), (Posner, Rothbart, Sheese, & Tang, 2007), and subsequently (Posner et al., 2007). If more than one, citations must be in *alphabetical* order. Every in-text citation must be included in the reference section; every reference must be cited in the text. Examples of reference styles:

Journal Article

Haltigan, J. D., Roisman, G. I., & Fraley, R. C. (2013). The predictive significance of early caregiving experiences for symptoms of psychopathology through midadolescence: Enduring or transient effects? *Development and Psychopathology*, 25, 209–221.

Book

Buss, A., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Erlbaum.

Chapter in an Edited Book

Gottlieb, G., & Willoughby, M. T. (2006). Probabilistic epigenesis of psychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology* (Vol. 1, 2nd ed., pp. 673–700). Hoboken, NJ: Wiley.

An Endnote style that reflects the *Publication Manual of the American Psychological Association* (6th ed.) is available for download [here](#).

Appendix (optional). Use only if needed.

Tables. Tables must be submitted as a separate MSWord file. Each table should begin on a separate page, and be typed double-spaced, numbered consecutively with an Arabic numeral, and given a short title (e.g., Table 5. Comparisons on language variables). All tables must be clearly cited in the text, and must be clearly labeled at the location they are to appear, e.g. "TABLE ONE HERE".

Figures. Figures must also be submitted as separate files, in either .TIFF or .JPG format. Each figure must be numbered consecutively with an Arabic numeral and a descriptive legend. Legends must be provided separately from the artwork (e.g., Figure 3. The progress in language development). Figures, which are normally in black and white, should be no larger than 6 × 9 in. If authors request color figures in the printed version, they will be contacted by CCC-Rightlink who are acting on our behalf to collect Author Charges. Please follow their instructions in order to avoid any delay in the publication of your article. Online-only color is provided free of cost. Diagrams must be computer generated. All labels and details must be clearly presented and large enough to remain legible at a 50% reduction. Artwork should be identified by figure number and short title. All figures must be cited in the text, and their location labeled in the same manner as Tables.

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Author Language Services

Cambridge recommends that authors have their manuscripts checked by an English language native speaker before submission; this will ensure that submissions are judged at peer review exclusively on academic merit. We list [a number of third-party services](#) specializing in language editing and/or translation and suggest that authors contact as appropriate. Use of any of these services is voluntary and at the author's own expense.

Last updated: 9th June 2016

Appendix B

Longitudinal Study of Australian Children Individual Deed of Licence



Australian Government

Department of Social Services

Individual Deed of Licence for Australian Researchers

Name of Researcher

ERIN J. SLATER

Parties

The Commonwealth of Australia as represented by the Department of Social Services (DSS)

AND

(Licensee)

Family Name	SLATER
First Name	ERIN
Title (Prof, Dr, Ms, Mr)	Ms
Name of Organisation	The Australian National University
Position (if student, specify current level e.g. Masters, PhD)	Clinical Psychology Student (Provisional Psychologist) - MASTERS
If a student, Name of Supervisor*	Dr. Richard O'Kearney
Contact Details of Supervisor	Email: richard.okearney@anu.edu.au Business Telephone: 612 58158
Postal Address (business)	Research School of Psychology The Australian National University Building 39 Science Road Canberra, ACT, 2601
Address (where data will be used)	Research School of Psychology The Australian National University Building 39 Science Road Canberra, ACT, 2601
Telephone (business)	04 13 46 71 42

Email (business)	Erin.Slater@anu.edu.au
Indicate how will data be accessed	<input checked="" type="checkbox"/> CD ROM <input type="checkbox"/> Secure Server <input type="checkbox"/> Secure Room
Have you ever used HILDA, LSAC, LSIC or BNLA before?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Note: If a student - *Supervisors must have independent access to the dataset for which the student is applying.

FOR USE OF THE FOLLOWING DATASET(S)

- ☐ HILDA General Release ☐ HILDA Unconfidentialised
☒ LSAC General Release ☐ LSAC Unconfidentialised
☐ LSIC General Release
☐ BNLA General Release

You will be sent the latest version and release of the nominated datasets.

Please note: Users of the unconfidentialised datasets need to abide by additional security requirements as stated in this Deed and the Manual. Before DSS will give approval to use the unconfidentialised datasets, applicants must demonstrate that they can meet the security requirements and justify the research need for data at this detailed level.

Background

- A. The Licensee wishes to use a DSS dataset/s for a specific research project that is to be conducted by the Licensee and is of interest to DSS in meeting its strategic priorities.
- B. The Commonwealth of Australia through DSS offers to provide the Dataset to the Licensee on the terms set out in this Deed and the Licensee accepts the terms.

Operative provisions

1 Definitions and interpretation

In consideration of the mutual promises contained in this document, the parties to this Deed agree as follows:

Definitions

1.1 In the Deed the following definitions apply:

Approved Research means the research project(s) which DSS has approved the use of the Datasets specified in clause 6.1 of this Deed.

Authorised User means a person who has been given permission by DSS to have access to and use the Datasets for the Approved Research. For more information see the Manual.

BNLA means the Building a New Life in Australia Survey, also known as the Longitudinal Study of Humanitarian Migrants.

Business Day means any day on which all banks are open for business generally in Canberra, Australian Capital Territory.

Business Owner means the Branch Manager, Policy Evidence Branch, DSS or another officer of DSS formally notified as the person to whom notices to DSS are to be addressed under clause 24.2.

Commencement Date means the date of execution of this Deed by both parties.

Commercial purposes means the use of DSS longitudinal data for a fee, rate, charge or other consideration, or directly or indirectly in connection with any business, or other undertaking intended for profit.

Confidential Information means, in relation to DSS, information that:

- (a) is by its nature confidential
- (b) is designated in writing by DSS as confidential;
- (c) is personal information under the *Privacy Act 1988*, protected information under section 23(1) of the *Social Security Act 1991*, or *protected information under Division 2 of Part 6 of A New Tax System (Family Assistance) (Administration) Act 1999*;
- (d) the Licensee knows or ought to know is confidential and includes:
 - i. the Datasets, if in a form which discloses any of the information referred to in paragraphs (a)–(d) above;
 - ii. other information comprised in or relating to any Intellectual Property of DSS or third parties (where that information is provided by the third party on behalf of DSS) if in a form which discloses any of the information referred to in paragraphs (a)–(d) above; or
 - iii. information relating to the internal management and structure of DSS, but does not include information which:

1. is or becomes public knowledge other than by breach of this Deed, other confidentiality obligations or the *Privacy Act 1988*, the *Social Security Act 1991*, or *A New Tax System (Family Assistance) (Administration) Act 1999*; or
2. the Licensee can establish by written evidence has been independently developed or acquired by the Licensee without breach of any obligation of confidence.

Datasets means any or all of the DSS;

- General and Unconfidentialised Release household and person level Unit Record Data from the Household, Income and Labour Dynamics in Australia (HILDA) survey;
- General and Unconfidentialised Release household and person level Unit Record Data from the Longitudinal Study of Australian Children (LSAC), which may include administrative linked dataset/s;
- General Release household and person level Unit Record Data from the Longitudinal Study of Indigenous Children (LSIC);
- General Release household and person level Unit Record Data from the Building a New Life in Australia (BNLA) survey; and
- Any variations or updates of Releases that may be released from time to time;

Document includes:

- (a) any paper or other material on which there is writing;
- (b) any paper or other material on which there are marks, figures, symbols or perforations having a meaning to persons qualified to interpret them; and
- (c) any article, material or media from which sounds, images or writings are capable of being reproduced with or without the aid of any other article or device.

DSS means the Commonwealth as represented by the Australian Government Department of Social Services.

FLoSse means the DSS Longitudinal Surveys Electronic Research repository into which users must directly deposit bibliographic details of research created using the datasets <http://flosse.dss.gov.au>.

General Release means a release of data from which personal information such as names, addresses (including postcodes) and date of birth have been

removed and other information has been modified by various methods such as top coding and the application of classification codes at a more general level.

HILDA means the Household, Income and Labour Dynamics in Australia survey, also known as Living in Australia.

Intellectual Property means copyright (and all associated rights, including moral rights), and all rights in relation to inventions, registered and unregistered trade marks (including service marks), registered and unregistered designs, and circuit layouts, and any other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields.

Licensee means the signatory of this Deed.

LSAC means the Longitudinal Study of Australian Children, also known as Growing Up in Australia.

LSIC means the Longitudinal Study of Indigenous Children, also known as Footprints in Time.

Manual means the Manual for Access and Use of DSS Longitudinal Datasets, prepared and updated by DSS and published on the NCLD website.

Organisation means the entity listed in the parties section of this Deed.

Permitted Geographic Area means any of the areas falling within the geographical area classifications that are described in the Australian Statistical Geography Standard (ASGS), 2011, released and used by the Australian Bureau of Statistics (ABS) for the collection and dissemination of geographically classified statistics. Descriptions of these geographical area classifications are available on the ABS website.

Personal Information means information or an opinion (including information or an opinion forming part of a database), whether true or not, and whether recorded in a material form or not, about an individual whose identity is apparent, or can reasonably be ascertained, from the information or opinion.

Release means a dataset that differs from another dataset from the same survey in that it contains additional information based on new responses from survey respondents. For the purposes of this Deed, a Release does not include a new version of the data in which changes have been made based on the existing information from respondents.

Research Material means any final research findings based on the analysis of the Dataset created by the Licensee.

Survey Contract Manager means in the case of HILDA, the Melbourne Institute of Applied Economic and Social Research (MIAESR) at the University of Melbourne, Australia and in the case of LSAC, the Australian Institute of Family Studies. DSS manages the functions of the Survey Contract Manager for LSIC and BNLA.

Unauthorised Person means a person who is not authorised in writing by DSS to use the Dataset.

Unconfidentialised Release means a release of data from which the names and addresses have been removed but includes other potentially confidential information such as postcodes, date of birth and data at a more detailed level than the General Release datasets.

Unit Record Data means records about individual respondents from the Datasets, also known as unaggregated data.

Interpretation

1.2 In this Deed, unless the context otherwise requires:

- 1.2.1 a reference to any law or legislation or legislative provision includes any statutory modification, amendment or re-enactment, and any subordinate legislation or regulations issued under that legislation or legislative provision;
- 1.2.2 a reference to any agreement or Document is to that agreement or Document as amended, novated, supplemented or replaced from time to time;
- 1.2.3 words in the singular include the plural and words in the plural include the singular;
- 1.2.4 all references to clauses are reference to clauses in this Deed;
- 1.2.5 where any word or phrase has been given a defined meaning, any part of speech or other grammatical form about that word or phrase has a corresponding meaning;
- 1.2.6 if an example is given of any thing (including a right, obligation or concept), the example does not limit the scope of that thing; and
- 1.2.7 each party provision of this Deed will be interpreted without disadvantage to the party who (or whose representative) drafted that provision, that is, the *contra proferentum* rule does not apply to this Deed.

2 Term of the Deed

- 2.1 This Deed takes effect on and from the Commencement Date and will continue in effect until terminated by either party in accordance with the Deed.

3 Licence

- 3.1 DSS grants to the Licensee a non-exclusive, non-transferable licence to use, copy, adapt and modify the Datasets on the terms set out in this Deed for the purposes of undertaking Approved Research for the term of this Deed.

4 Roles, Responsibilities and Access Management

- 4.1 The Licensee agrees to comply with all procedures and requirements specified in this Deed and the Manual as at the Commencement Date which forms part of the documentation for the administration of this Deed.
- 4.2 The Licensee agrees to regularly check for updates to the Manual.
- 4.3 The Licensee must comply with the provisions set out in the latest version of the Manual. If the Licensee is unable or unwilling to comply with the provisions therein, the Licensee must immediately notify DSS and relinquish all DSS datasets in the Licensee's possession by returning them to DSS.
- 4.4 In the event of any inconsistency between the latest version of the Manual and this Deed, the Licensee must comply with the requirements which produce the highest level of protection of the Confidential Information.

5 Administration Fee

- 5.1 The Licensee must pay the administration fee of \$77 to the Survey Contract Manager prior to the Dataset being provided.
- 5.2 The Survey Contract Manager will provide a tax invoice or payment link as soon as is reasonably practicable.

6 Restrictions on use of the Dataset

- 6.1 The Dataset must only be used for the purposes of undertaking the following research project until the expected date of completion:

What are the research aims/ questions or hypotheses for which you will be using the data?

Given the increasing presence of prematurity, the proposed study aims to build upon the existing field of research examining the life outcomes of infants born too early. This project aims to confirm the pattern that as a cohort adolescents born premature tend experience higher levels of emotional dysfunction such as anxiety and depression than their counterparts born at correct gestation and to further explore the presence of eating disorder, self-injurious behaviour and underage substance use in pre-terms in an Australian sample. This project seeks to examine the extent to which parenting behaviour and parental psychopathology differs in its influences on the development of adolescent psychopathology in preterm and term-born Australian adolescents aged 14-15 years.

This research is significant given the burden psychological distress can place on the individual, their family and the health system. Investigating factors which may enhance the likelihood of psychological dysfunction such as depression and anxiety in later life for infants born premature is particularly important. If we can gather a better understanding as to which parenting behaviour and parental psychopathology exert a differing influence on depression, anxiety and self-injurious behaviour in preterm compared to term-born adolescents, intervention programs targeting this group may be able to be enhanced.

The following hypotheses have been proposed:

H1: In an Australian sample of 14-15 year olds, adolescents classified as premature will as a group have a higher incidence of depressive and anxious symptomatology than term-born adolescents.

H2: Psychological dysfunction at ages 4-5 years will correlate more strongly with dysfunction at ages 14-15 years for preterm than term-born adolescents.

H3: Adolescents in the preterm group will display higher incidence of self-injurious behaviour than term born peers.

H4: Adolescents born preterm will display greater eating disorder behaviour than adolescents born at term with lowest birth weight correlating with the greatest disordered behaviour. Such behaviour is additionally predicted to be greater in girls than boys.

H5: Dismissive and Intrusive/controlling parenting behaviour will be more prevalent in the preterm group and more strongly associated with adolescent psychological dysfunction than the other parenting behaviours

What is your analytical plan or the key variables you will be examining?

Key variables to be examined include:

Birth Status (Gestational age and Birth weight)

Adolescent Emotional/Psychological distress (i.e. dhs17v, dhs37v; hse16b1-hse16b8; hse21c1-hse21c13; hsmfq; hgd09a-hgd09e; hhs59a-hhs59p; hse03p3b; hse03p3c; hse03p3d)

Adolescent Alcohol and Substance use (i.e. hhb16c9 – hhb16c14e; hhb26c1 - hhb28c6)

Adolescent self-harm behaviour (i.e hhs54a- hhs5f)

Adolescent eating behaviour (i.e. hcbmi, hwtstat, hbulimia, hanorexia, heatingdis, hhb30a1-hhb30e3)

Parental Mental Health History (i.e. ehs48a30 – ehs48a36, ehs44a30-ehs44a36; hpk6)

Parenting behaviour (i.e. hre09a-hre09h; hpa25a-hpa25i; hre08c; hpa22a-hpa22d; hpa20a1-hpa20a14, hpa20b1-hpa20b14, hpwarm, hpireas,hpirb, hpirc, hpcons, hpang, hpanga)

What outputs do you intend will result from this research (e.g. journal article, thesis, book chapter, report, conference presentation etc)? (If you intend to produce more than one article, please include all that you know about at the time of application.)

Master of Clinical Psychology Research Thesis And Associated Journal Article

If this project is being sponsored or commissioned by an agency other than the organisation listed in this application, please provide the full name of the sponsoring organisation (for administrative purposes only). If a grant, please provide grant number/s.

N/A

Please list who will be on this project with you. Please note if these persons intend to use the data then they must also apply independently

Name: ERIN SLATER

Project Role: PRIMARY

RESEARCHER

Name: DR. RICHARD O'KEARNEY

Project Role: RESEARCH

SUPERVISOR

Who will own the Intellectual Property of the research material for which the data will be used?

ERIN SLATER AND THE AUSTRALIAN NATIONAL UNIVERSITY

Is this project being undertaken for commercial purposes?

Yes ☐ No ☒

Expected Date of Completion of Research 31 / 01 /18 (dd/mm/yy) *up to a maximum of 3 years from the date of application*

- 6.2 If the Licensee requires the data beyond the three years he or she may apply to DSS in writing prior to the termination date requesting permission to retain the data for an additional specified length of time.
- 6.3 The Licensee must obtain approval from DSS before using the Dataset for any research project other than specified in this clause. To obtain approval for any additional research, the Licensee should email longitudinalsurveys@dss.gov.au.
- 6.4 This Deed is granted based on the Licensee's association with the Organisation listed under Parties of this Deed. If the Licensee ceases association with that Organisation, the Licensee must inform DSS and must obtain prior written approval from DSS before using the Dataset while undertaking research for or with another organisation.
- 6.5 The Licensee may modify the Dataset in order to undertake data analysis (e.g. create new derived data items, aggregate and manipulate the data).

6.6 The Licensee may copy/reproduce the Dataset for the permitted purpose, but may not copy/reproduce the Dataset for any other reason (e.g. give copies of the Dataset to Unauthorised Persons).

6.7 The Licensee must not:

6.7.1 use the Unconfidentialised dataset for the purpose of reporting on or showing data in relation to a geographic area other than a Permitted Geographic Area; or

6.7.2 perform any matching, sharing, merging or linkage of any of the HILDA dataset with any non-HILDA datasets or any of the LSAC datasets with any non-LSAC datasets or any of the LSIC datasets with any non-LSIC datasets or any of the BNLA datasets with any non-BNLA datasets without the prior written consent of DSS; or

6.7.3 attempt to identify any individuals in the Dataset; or

6.7.4 publish, in any form, any part of the Dataset; or

6.7.5 in relation to the LSAC datasets, use the ACARA MySchool institution level data to calculate or publish material which ranks schools.

7 DSS responsibility for the Dataset

7.1 The Dataset is provided to the Licensee on an 'as is' basis and DSS is not responsible for its accuracy, quality or fitness for purpose.

8 Provision of the Dataset

8.1 Subject to clause 5.1 DSS will use its best endeavours to arrange the provision of the Dataset to the Licensee as soon as possible after the Commencement Date.

8.2 DSS must notify the Licensee immediately in writing of any delay in the arrangement of the provision of the Dataset in accordance with clause 8.1 and in this event the parties will agree on a revised delivery date and appropriate changes to other timing obligations included in this Deed.

9 Security

9.1 The Licensee must comply at all times with the following security requirements in relation to the Datasets with a classification of unclassified – (DLM) for General Release and unclassified – (official use only) for Unconfidentialised datasets:

Only allow the Unit Record Data from the Datasets to be viewed by Authorised Users. Store all complete or partial dataset/s, in accordance with the baseline security controls detailed within the Australian Government Protective Security Policy Framework (PSPF) and the Australian Government Information Security Manual (ISM) applicable to Australian government information which requires some level of protection.

Further information relating to the PSPF and the ISM can be found on the following websites:

- Protective Security Policy Framework:
<http://www.protectivesecurity.gov.au>
- Information Security Manual: <http://www.asd.gov.au/infosec/ism/>

The PSPF and ISM may be updated from time to time. The Licensee must regularly check for updates to these documents and comply with the provisions set out in the latest version.

9.2 The following ISM standards are the minimum requirements for users of DSS longitudinal Datasets. These include but are not limited to:

- a. Agencies must register all ICT equipment and media with a unique identifier in an appropriate register

(control 0336 of ISM (control last updated Sep 2011))

- b. To destroy media, agencies must either:

- Break up the media
- Heat the media until it has either burnt to ash or melted
- Degauss the media

(control 0364 and see 0366 of ISM (control last updated Nov 2010))

- c. Agencies using passphrases as the sole method of authentication must enforce the following passphrase policy:

- a minimum length of 13 alphabetic characters with no complexity requirement; or
- a minimum length of 10 characters, consisting of at least three of the following character sets:
 - lowercase alphabetic characters (a-z)
 - uppercase alphabetic characters (A-Z)
 - numeric characters (0-9)
 - special characters.

(control 0421 of ISM (control last updated April 2015))

- d. Securing ICT equipment and media during operational and non-operational hours. ICT equipment and media needs to be stored in accordance with the *Australian Government Physical Security Management Protocol*.

The physical security requirements of the Australian Government Physical Security Management Protocol can be achieved by:

- ensuring ICT equipment and media always resides in an appropriate security zone
- storing ICT equipment and media during non-operational hours in an appropriate security container or room

- using ICT equipment with a removable hard drive which is stored during non-operational hours in an appropriate security container or room as well as sanitising the ICT equipment's Random Access Memory (RAM)
- using ICT equipment without a hard drive as well as sanitising the ICT equipment's RAM
- using an encryption product to reduce the physical storage requirements of the hard drive in ICT equipment to an unclassified level as well as sanitising the ICT equipment's RAM

Agencies must ensure that ICT equipment and media with sensitive or classified information is secured in accordance with the requirements for storing sensitive or classified information in the *Australian Government Physical Security Management Protocol*.

(control 0161 of ISM (control last updated Sep 2011))

10 Administrative Requirements

10.1 The Licensee agrees to comply at all times with the following Administrative minimum requirements.

- only allow the Unit Record Data from the Datasets to be viewed by Authorised Users;
- access to the password protected drive is only by Authorised Users and the password must only be known to Authorised Users of the Datasets;
- where the Authorised User has access to the **General Release** dataset via CD ROM or DVD it is to be kept and used only on the Organisation's premises;
- where the Authorised User does not have access to the **Unconfidentialised** dataset via a password protected server, Authorised Users may download the Dataset onto a password protected stand alone computer on the Organisation's premises;
- there must be an effective means of limiting entry during both operational and non-operational hours to rooms or buildings in which the **General Release** datasets are used or stored. If possible and where practical, the room must be locked when an Authorised User is not there;
- there must be an effective means of limiting entry during both operational and non-operational hours to the dedicated lockable room/s in which the **Unconfidentialised** datasets are used or stored. The room must be locked when an Authorised User is not there;
- the keys or combinations to lockable containers in which Datasets are kept must be kept secure and not be given to any Unauthorised Person;

- h. a record must be kept of all people who have been issued with keys and/or combinations to containers in which the Datasets are used or stored;
- i. any unit record output from the Datasets must not be left unsecured for more than 10 minutes, and must be stored in a locked commercial grade container and disposed of using a crosscut shredder when no longer required;
- j. when using the Datasets, users must lock their screen when they are away from their workstation;
- k. the Business Owner or their nominated representative may with at least three Business Days' notice and during normal business hours make a physical inspection of the premises in which the Datasets are stored or used to ensure the security and administrative measures are in place, subject to the Business Owner complying with the security measures of the Organisation.

11 User support

- 11.1 DSS will provide Authorised Users, through the Survey Contract Manager, with technical assistance to the Licensee in use of the Dataset in accordance with this Deed.

12 Non-disclosure

- 12.1 In consideration of DSS disclosing certain Confidential Information to the Licensee, the Licensee acknowledges and agrees with DSS:

12.1.1 that all Confidential Information is confidential, is the property of DSS, and is of value to DSS, and that any Confidential Information disclosed to the Licensee is only disclosed pursuant to the terms of this Deed;

12.1.2 to keep Confidential Information confidential at all times;

12.1.3 that it must not, other than with the prior written approval of DSS (which may be granted or withheld in DSS's absolute discretion);

- (a) use;
- (b) disclose;
- (c) divulge;
- (d) make a digital or any other copy of;
- (e) transmit electronically (including via email); or

(f) deal with,

any Confidential Information, nor allow any act, matter or thing to be done or occur whereby any Confidential Information may be ascertained or used by, or disclosed or communicated to, any other person, except in accordance with the terms of this Deed; and

12.1.4 that it must observe and be bound by the provisions of this Deed.

12.2 The Licensee must:

12.2.1 take all reasonable steps and do all reasonable things necessary, and do all things that may be reasonably required by DSS to keep the Confidential Information, including all Documents, and all other things recording, containing, setting out or referring to any Confidential Information, under effective control of the Licensee and protected from any unauthorised use or access;

12.2.2 immediately notify DSS if the Licensee becomes aware of any unauthorised access to, or use or disclosure of, any Confidential Information;

12.2.3 ensure that Confidential Information is not given to a person who is not an Authorised User;

12.2.4 if required at any time by DSS to do so, deliver up to DSS, or at the option of DSS destroy, without limitation, all Documents containing any Unit record Data in the possession, custody or control of the Licensee; and

12.2.5 if required by DSS:

- (a) permit DSS or any nominees of DSS, upon at least three Business Days' notice and during normal business hours and subject to the security measures of the Licensee's Organisation, reasonable access to those premises where the Datasets are stored or being used, and records of the Licensee, (including without limitation, access to any of the Licensee's computer hard drives and computer disks containing Confidential Information belonging to DSS) to ensure or check compliance with this Deed; and/or
- (b) provide to DSS a statutory declaration signed by the Licensee stating that they have complied with clause 12.2.4.

12.3 The Licensee may retain a copy of the Confidential Information if, and only to the extent to which and for the purpose for which, the Licensee is required by law to do so but subject to compliance with clause 12.1.

12.4 This clause 12 will survive the expiration or termination of this Deed.

13 Disclosure as required by law

- 13.1 The Licensee may disclose any Confidential Information which the Licensee is required by law to disclose, but only if the extent and the manner of the disclosure is strictly limited to what is required by law.
- 13.2 The Licensee undertakes to provide DSS with sufficient notice to enable DSS to seek a protective order or other relief from disclosure and to provide all assistance and co-operation which DSS reasonably considers necessary for that purpose.

14 Intellectual Property

- 14.1 The Licensee acknowledges and agrees that the Commonwealth owns all Intellectual Property rights in the Dataset.
- 14.2 Except where specified under a separate agreement, the Commonwealth will not own the Intellectual Property rights in any Research Material created using the Dataset to the extent the Research Material does not include the Unit Record Data.
- 14.3 The Licensee must enter into FLoSse, bibliographic details of any final Research Material produced by the Licensee using the Datasets within 30 days of completion.
- 14.4 The Licensee is exempt from the requirements in clause 14.3 if the Research Material is for internal administration of Australian Government agencies or for confidential business purposes for the Australian Government.
- 14.5 Where the Licensee has ownership of the Intellectual Property, the Licensee grants a perpetual licence to the Commonwealth to use, reproduce, adapt and modify the Research Material for any of the Commonwealth's Internal Purposes.
- 14.6 For the purposes of this clause 14, the Commonwealth's Internal Purposes means:
 - 14.6.1 use of the Research Material by DSS to understand the extent to which the Datasets are being used; and
 - 14.6.2 ready access by the Commonwealth to information and research to support internal policy development and evaluation.
- 14.7 Where the Licensee is not the owner of the Intellectual Property of the Research Material, the Licensee warrants that he or she will procure a sub-licence from a third party for the Research Material on the same terms as the Licensee grants to DSS under clause 14.5.
- 14.8 If the Commonwealth wishes to make any part of the Research Material publicly available, the Commonwealth will first obtain the written consent of the owner of the Intellectual Property.

14.9 This clause 14 will survive the expiration or termination of this Deed.

15 Acknowledgement and Disclaimer

15.1 The Licensee agrees to acknowledge DSS and the Survey Contract Manager for the use of the Dataset and assistance provided in using the Dataset in any reports and publications that use the Dataset.

15.2 The Licensee agrees that any of the material produced by the Licensee and made publicly available will include the acknowledgment in the latest version of the Manual or any variation of the acknowledgement which has been approved in writing by DSS in any reports and publications.

16 Privacy

16.1 The Licensee agrees with respect to all Confidential Information made available or provided by DSS or any other person at any time which comprises Personal Information as defined in the *Privacy Act 1988 (the Act)*:

16.1.1 to comply as if they were an agency bound by the Act with those provisions of the Act concerning the security, use and disclosure of information;

16.1.2 to co-operate with any reasonable demands or enquiries made by the Privacy Commissioner;

16.1.3 to ensure that any person who has an access level which would enable that person to obtain access to any information in respect of which DSS has obligations under the Act is made aware of, and undertakes in writing, to observe the provisions referred to in clause 16.1.1 above;

16.1.4 to take all reasonable measures to ensure that such information is protected against loss and against unauthorised access, use, modification, disclosure or other misuse and that only Approved Individuals have access to it;

16.1.5 not to transfer such information outside Australia, or allow parties outside Australia to have access to it, without the prior written approval of DSS;

16.1.6 to immediately notify DSS when the Licensee becomes aware of a breach of security by any Individual; and

16.1.7 to notify DSS of, and co-operate with DSS in the resolution of, any complaint alleging an interference with privacy.

16.2 The Licensee's obligations in this clause 16 are in addition to, and do not restrict, any obligations it may have under:

16.2.1 the Act; or

16.2.2 any privacy codes or privacy principles contained in, authorised by or registered under any law including any such privacy codes or principles that would apply to the Licensee but for the application of the other provisions of this clause 16.

16.3 This clause 16 will survive the expiration or termination of this Deed.

17 Conflict of interest

17.1 The Licensee warrants that no conflict of interest exists or is likely to arise while in receipt of Confidential Information.

17.2 The Licensee warrants that it will not permit any situation to arise or engage in any activity that may result in a conflict of interest with the Licensee's receipt of Confidential Information.

18 Legal requirements

18.1 Each party acknowledges and agrees to comply with the law in force in the Australian Capital Territory (Australia), including but not limited to:

18.1.1 *Social Security Act 1991*;

18.1.2 *Privacy Act 1988*; and

18.1.3 *Criminal Code Act 1995*.

18.2 The Licensee acknowledges that unauthorised disclosure of information held by the Commonwealth is subject to the sanction of criminal law under sections 70 and 79 of the *Crimes Act 1914* and section 91.1 of the *Criminal Code Act 1995*.

19 Indemnity

19.1 The Licensee agrees to indemnify DSS from and against any:

19.1.1 cost or liability incurred by DSS;

19.1.2 loss of or damage to property of DSS; or

19.1.3 loss or expense incurred by DSS in dealing with any claim against it including reasonable legal costs and expenses on a solicitor/own client basis;

arising from:

19.1.4 any negligent act or omission by the Licensee in connection with the use of the Dataset;

19.1.5 any breach by the Licensee of its obligations or warranties under this Deed;

19.1.6 any use or disclosure by the Licensee of Confidential or Personal Information held or controlled in connection with this Deed; or

19.1.7 the use by DSS of the Research Material as intended under this Deed but only to the extent that the Research Material has not been misquoted or taken out of context.

19.2 The Licensee's liability to indemnify DSS under clause 19.1 will be reduced proportionately to the extent that any negligent act or omission of DSS contributed to the relevant liability, loss or damage, or loss or expense.

19.3 The right of DSS to be indemnified under this clause 19 is in addition to, and not exclusive of, any other right, power or remedy provided by law, but DSS is not entitled to be compensated in excess of the amount of the relevant liability, loss or damage, or loss or expense.

19.4 This clause 19 will survive the expiration or termination of this Deed.

20 Applicable law

20.1 This Deed will be governed by and construed in accordance with the laws of the Australian Capital Territory (Australia) and the Licensee agrees to submit to the non-exclusive jurisdiction of the courts of the Australian Capital Territory in respect of all matters arising under, or in relation to, this Deed.

21 No exclusion

21.1 This Deed does not exclude the operation of any principle of law or equity intended to protect and preserve the confidentiality of the Confidential Information.

21.2 The rights and remedies provided under this Deed are cumulative and not exclusive of any rights or remedies provided by law.

22 Dispute resolution

22.1 DSS and the Licensee will attempt in good faith to resolve through negotiation any disputes, claim or controversy arising out of or relating to this agreement.

23 Termination of Deed

23.1 This Deed may be terminated by either party providing at least 14 days prior notice in writing.

23.2 DSS may terminate this Deed by notice in writing, with effect from the date in the notice, if the Licensee fails to remedy a breach of the Deed within 30 days of being given notice by DSS requiring the breach to be remedied.

23.3 On expiration or termination of this Deed in accordance with clause 23.1 or clause 23.2, the Licensee must immediately relinquish all DSS datasets in the Licensee's possession by returning them to DSS or take such other steps as agreed with DSS.

24 Notices

Giving notices

24.1 A notice, consent, information, application or request that must or may be given or made to a party under this Deed is only given or made if it is in writing and:

24.1.1 delivered or posted to that party at its address set out below;

24.1.2 emailed to that party at its email address set out below; or

24.1.3 faxed to that party at its fax number set out below.

24.2 If a party gives the other party 5 business days' notice of a change of its email or postal address, a notice, consent, information, application or request is only given or made by that other party if it is delivered, posted or emailed to the latest address.

DSS

Name: Department of Social Services
Business Owner Longitudinal Surveys
National Centre for Longitudinal Data
Policy Evidence Branch TOP DE4

Postal Address: PO Box 9820
Canberra ACT 2610

Email: longitudinalsurveys@dss.gov.au

Fax: 02 6206 9545

Licensee

Name:
Ms Erin J Slater

Position:
Clinical Psychology Student (Provisional Psychologist)- MASTERS

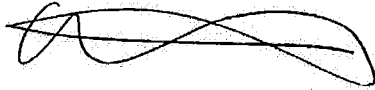
Address:
Research School of Psychology
The Australian National University
Building 39
Science Road
Canberra, ACT, 2601

Email:
erin.slater@anu.edu.au

Fax Number: 61 25 04 99

I understand that I must provide DSS with any changes to the above information.

Signature of the Licensee



Time notice is given

24.3 A notice, consent, information, application or request is to be treated as given or made at the following time:

24.3.1 if it is delivered, when it is left at the relevant address;

24.3.2 if it is sent by post, 5 Business Days after it is posted; or

24.3.3 if it is sent by email or fax, upon actual receipt by the addressee.

If a notice, consent, information, application or request is delivered after the normal business hours of the party to whom it is sent, it is to be treated as having been given or made at the beginning of the next Business Day.

25 Miscellaneous

Assignment

25.1 Except as expressly permitted by this Deed, the Licensee must not assign any of their rights under this Deed without the prior written consent of DSS. That consent may be given or withheld at DSS's absolute discretion.

Costs

25.2 Each party will bear its own costs in relation to this Deed, including the exercise of rights and performance of obligations specified in the Deed.

Entire agreement

25.3 This document contains everything the parties have agreed on in relation to the matters it deals with. No party can rely on an earlier document, or anything said or done by another party, or by a director, officer, agent or employee of that party, before this Deed was executed, save as permitted by law.

No agency or partnership

25.4 No party is an agent, representative, partner of any other party by virtue of this Deed.

No authority to act

25.5 No party has any power or authority to act for or to assume any obligation or responsibility on behalf of another party, to bind another party to any agreement, negotiate or enter into any binding relationship for or on behalf of another party or pledge the credit of another party except as specifically provided in this Deed or by express agreement between the parties.

Severability

25.6 If a clause or part of a clause of this Deed can be read in a way that makes it illegal, unenforceable or invalid, but can also be read in a way that makes it legal, enforceable and valid, it must be read in the latter way. If any clause or part of a clause is illegal, unenforceable or invalid, that clause or part is to be treated as removed from this Deed, but the rest of this Deed is not affected.

Time for action

25.7 If the day on or by which something is required to be done or may be done is not a Business Day, that thing must be done on or by the next Business Day.

Variation

25.8 No variation of this Deed will be of any force or effect unless it is in writing and signed by the parties to this Deed.

Waiver

25.9 The fact that a party fails to do, or delays in doing, something the party is entitled to do under this Deed, does not amount to a waiver of any obligation of, or breach of obligation by, another party. A waiver by a party is only effective if it is in writing. A written waiver by a party is only effective in relation to the particular obligation or breach in respect of which it is given. It is not to be taken as an implied waiver of any other obligation or breach or as an implied waiver of that obligation or breach in relation to any other occasion.

Execution

Executed as a DEED on Date: *16/06/16*

Signed, sealed and delivered for and on behalf of **THE COMMONWEALTH OF AUSTRALIA** as represented by the Department of Social Services by

Name of authorised officer (print)


Signature of authorised officer

Delegate, Longitudinal Surveys

Name of HILDA authorised officer (print)

Signature of HILDA authorised officer

Helene Shaw
Name of LSAC authorised officer (print)


Signature of LSAC authorised officer

Name of LSIC authorised officer (print)

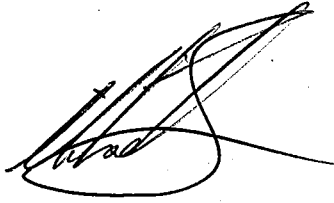
Signature of LSIC authorised officer

Name of BLNA authorised officer (print)

Signature of BLNA authorised officer

In the presence of

MICHAEL BARNES
PROJECT OFFICER
DEPT. SOCIAL SERVICES
Name of witness (print)


Signature of witness

Signed, sealed and delivered by

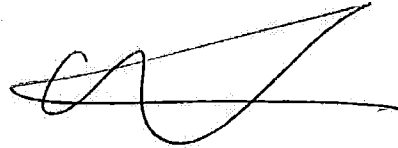
Ms. Erin Slater

Name of Licensee (researcher)

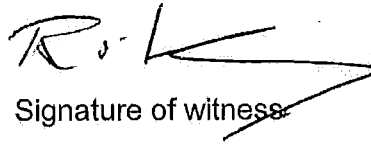
In the presence of:

Dr. Richard O'Kearney

Name of witness

A handwritten signature in black ink, appearing to be 'ES' with a long horizontal stroke extending to the right.

Signature of Licensee (Researcher)

A handwritten signature in black ink, appearing to be 'R. O'Kearney' with a long horizontal stroke extending to the right.

Signature of witness